Design and development of a distributed, secure and resilient vault management system

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As today's computer systems grow in both usage time and complexity, we believe they are currently unable to address the problem of allowing entities to exchange data, because they are flawed either in terms of security or privacy. To this end, we studied how to create an easily accessible platform, both for humans and computers, that would allow them to exchange data with only whom they desire.

The first goal is to provide a secure centralized location which provides those facilities. Based on SMTP, we design a protocol that suits our needs. We study a database structure required for achieving our goals and describe the requirements for the human interface (a website or a mobile app) and for the machines (an API).

We then extend the model to a decentralized one providing resilience, and we replicate the data at two levels: between closely related servers, thanks to the mechanisms provided by the databases, but also between further location, by implementing, testing and reviewing two solutions envisaged by our peers.

Finally we describe the implementation of the model, from its design to its development using Typescript / NodeJS / Angular2 / MongoDB. We study the performances of the model, both for the backend and the frontend, and reveal the possibility of deploying such a model if users are indeed interested in the solution.

Anyone can read more about the project at https://wissl.org.